

CLAIMS

1. An n-type ohmic electrode for use with an n-type Group III nitride semiconductor, which is provided to contact with the surface of an n-type Group III nitride semiconductor layer, wherein the n-type ohmic electrode layer is made of an alloy of aluminum (atomic symbol: Al) and lanthanum (atomic symbol: La) or comprises lanthanum.

5           2. The n-type ohmic electrode according to claim 1, wherein the lanthanum content in the n-type ohmic electrode layer is 10 mass% or more on the surface contacting with the n-type Group III nitride semiconductor layer.

10          3. The n-type ohmic electrode according to claim 2, wherein the lanthanum content in the n-type ohmic electrode layer is less than 10 mass% in the region 30 nm or more distant from the junction interface with the n-type Group III nitride semiconductor layer.

15          4. The n-type ohmic electrode according to claim 3, wherein the surface of the n-type ohmic electrode layer opposite the surface contacting with the n-type Group III nitride semiconductor layer is made of aluminum.

20          5. A semiconductor light-emitting device fabricated by providing an ohmic contact electrode on a stacked structure body in which an n-type Group III nitride semiconductor layer and a p-type compound semiconductor layer are provided on one surface of a crystalline substrate and a light-emitting layer is interposed between the n-type and p-type compound semiconductor layers, wherein the n-type ohmic electrode provided to contact with the n-type Group III nitride semiconductor layer is made of a lanthanum-aluminum alloy layer or a lanthanum layer.

25          6. The semiconductor light-emitting device according to claim 5, wherein the n-type ohmic electrode comprises a lanthanum-aluminum alloy layer or a lanthanum

layer in the side contacting with the n-type Group III nitride semiconductor layer and comprises an aluminum layer in the opposite side.

7. The semiconductor light-emitting device  
5 according to claim 5 or 6, wherein the n-type ohmic electrode comprises a lanthanum-aluminum alloy layer having a lanthanum content of 10 mass% or more at the junction interface with the n-type Group III nitride semiconductor layer and having a lanthanum content of  
10 less than 10 mass% in the region 30 nm or more distant from the junction interface.

8. A method for forming an n-type ohmic electrode,  
comprising forming a lanthanum-aluminum alloy layer  
constituting the n-type ohmic electrode, by using a  
15 lanthanum-dialuminum alloy (compositional formula: LaAl<sub>2</sub>)  
as a raw material.

9. The method for forming an n-type ohmic electrode according to claim 8, wherein the lanthanum-aluminum alloy layer is provided to join it to the  
20 surface of an n-type Group III nitride semiconductor layer while setting the n-type Group III nitride semiconductor layer at 300°C or less, thereby forming an n-type ohmic electrode from a lanthanum-aluminum alloy layer having a lanthanum content of 10 mass% or more at the junction interface and having a lanthanum content of  
25 less than 10 mass% in the region 30 nm or more distant from the junction interface.

10. A method for producing a semiconductor light-emitting device, comprising providing an ohmic contact  
30 electrode on a stacked structure body in which an n-type Group III nitride semiconductor layer and a p-type compound semiconductor layer are provided on one surface of a crystalline substrate and a light-emitting layer is interposed between the n-type and p-type compound  
35 semiconductor layers, wherein the lanthanum-aluminum alloy layer constituting an n-type ohmic electrode which contacts with the n-type Group III nitride semiconductor

layer is formed by using a lanthanum-dialuminum alloy (compositional formula: LaAl<sub>2</sub>) as a raw material.

11. The method for producing a semiconductor light-emitting device according to claim 10, wherein the  
5 lanthanum-aluminum alloy layer is provided to join it to the surface of the n-type Group III nitride semiconductor layer while setting the n-type Group III nitride semiconductor layer at 300°C or less, thereby forming an n-type ohmic electrode from a lanthanum-aluminum alloy layer having a lanthanum content of 10 mass% or more at the junction interface and having a lanthanum content of less than 10 mass% in the region 30 nm or more distant  
10 from the junction interface.